

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY



(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

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Applicant's or agent's file reference PCT00033	FOR FURTHER ACTION		See Form PCT/PEA/416
International application No. PCT/IT2004/000400	International filing date (day/month/year) 22.07.2004	Priority date (day/month/year) 24.07.2003	
International Patent Classification (IPC) or national classification and IPC H01M2/04, H01M2/12, H01M2/36			
Applicant STOCCHIERO, Franco			
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau a total of 6 sheets, as follows:</p> <p><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>			
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>			
Date of submission of the demand 16.09.2005		Date of completion of this report 20.01.2006	
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016		Authorized Officer Fernandez Morales, N Telephone No. +31 70 340-3888 	

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/IT2004/000400

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

Description, Pages

1, 2, 5-9	as originally filed
3, 4	received on 20.09.2005 with letter of 16.09.2005

Claims, Numbers

1-9	received on 20.09.2005 with letter of 16.09.2005
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Drawings, Sheets

1/9-9/9	as originally filed
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- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/IT2004/000400

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-9
	No: Claims	
Inventive step (IS)	Yes: Claims	1-9
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-9
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

Reference is made to the following documents:

D1: EP-A-1 298 739 (EXIDE INDUSTRIES LTD; SHIN-KOBE ELECTRIC MACHINERY
CO. LTD) 2 April 2003 (2003-04-02)

The document D1 is regarded as being the closest prior art to the subject-matter of claims 1 and 9, and shows (the references in parentheses applying to this document):

Cover for an electric accumulator of the type with free electrolyte adapted to be integral with the container of said accumulator, said cover comprising at least one valve device (24) having an inlet (figure 6) communicating with one or more cells (C1 to C6) of said accumulator and an outlet communicating (figure 6) with the external environment, said valve device (24) being adapted to prevent the leaking of electrolyte present in said one or more cells and to allow the disposal to the outside of the gases that develop inside said accumulator when the pressure in one of said one or more cells (C1 to C6) exceeds a predetermined value. Said valve device (24) communicates with said one or more cells (C1 to C6) through at least one discharge channel (18) having at least one inlet mouth (figure 5) communicating with at least one of said one or more cells (C1 to C6) and at least one outlet mouth (figure 5) communicating with said inlet (figure 5). Said discharge channel (18) is provided with accumulation chambers (CH1 to CH6) that communicate with each other.

The subject-matter of claims 1 and 9 differ from this known cover for an electric accumulator in that said at least one inlet mouth communicates with said one or more cells through at least one accumulation chamber each communicating with one of said one or more cells through at least one vent channel.

The subject-matter of claims 1 and 9 is therefore new (Article 33(2) PCT).

The problem to be solved by the present invention may be regarded as to effectively hold the electrolyte in order to prevent it from mixing and to ease its return into the corresponding cell, especially in the case of anomalous positioning of the accumulator.

The solution to this problem proposed in claims 1 and 9 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons: The closest prior art (D1) discloses the use of accumulation chambers communicating with each other, but not the use of second accumulation chambers linking respectively each cell with the discharge channel. The invention lies firstly in the use of second accumulation chambers that allow a more effective holding the electrolyte and, therefore preventing it from mixing and easing its return into the corresponding cell and secondly in the constructional solution for adapting these second accumulation chambers via linking the accumulation chambers to the corresponding cell with a vent channel and to the discharge channel with an inlet mouth.

Claims 2-8 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

irreparable damage.

A further drawback consist of the fact that the vapours and the gases that do not condense are discharged to the outside contributing to lowering the level of electrolyte in the cells. This determines a worsening of the performance of the accumulator and a progressive damaging of the plates.

A further drawback consists of the fact that the level of electrolyte in each cell, which lowers for the aforementioned causes, must be periodically checked and hastily restored through onerous maintenance interventions.

Another drawback consists of the fact that such maintenance interventions must be carried out with a certain frequency.

The purpose of the present invention is to overcome said drawbacks.

In particular, a first purpose of the invention is to realise a cover for an electric accumulator with free electrolyte and a relative accumulator that does not have losses of electrolyte even if placed in critical positions.

Another purpose is to realise a cover and a relative accumulator that can operate to charge and discharge in the undesired positions described above even for considerable time periods, without having losses of electrolyte.

A further purpose is to realise a cover and an accumulator that have all of the necessary safety characteristics required by current standards and regulations.

Another purpose of the invention is to realise a cover and an accumulator that maintain their efficiency even after having taken up positions not suitable for its perfect operation without the need for corrective interventions.

A further purpose is to realise a cover and an accumulator that keep the level of electrolyte inside each cell substantially constant, even after having taken up positions different to those foreseen in normal operation.

Another purpose is to realise a cover and an accumulator that require less maintenance interventions per unit time with respect to comparable known accumulators.

The last but not least purpose is to realise an accumulator that is cost-effective and simple to realise.

Said purposes are accomplished by a cover for an electric accumulator of the type with free electrolyte ^{in accordance with claim 1.} adapted to be integral with the container of said

~~accumulator, characterised in that it has at least one valve device having an inlet communicating with at least one cell of said accumulator and an outlet communicating with the external environment, said valve device being adapted~~

~~to prevent the leaking of electrolyte present in said at least one cell and to allow the disposal to the outside of the gases that develop inside said accumulator when the pressure in said at least one cell exceeds a predetermined value.~~

In the same way, said purposes and advantages are accomplished by an electric accumulator of the type with free electrolyte ~~that comprises~~ in accordance with claim

~~- a container provided on the inside with at least one cell adapted to house the plate groups of said accumulator and to contain the electrolyte;~~

~~- at least one cover adapted to close said container;~~

~~characterised in that said at least one cover is provided with the aforementioned solution.~~

Advantageously, the proposed solution allows the gases that develop inside the accumulator to be vented when they exceed a certain pressure and at the same time allows the leaking of the electrolyte to be avoided in the case of anomalous positioning of the accumulator.

Said purposes and advantages shall become clearer during the description of some preferred embodiments, given for indicating and not limiting purposes, with reference to the attached tables of drawings, where:

- figure 1 represents a partially sectioned axonometric view of a cover for electric accumulators with free electrolyte object of the present invention, installed on an accumulator also object of the present invention;
- figure 2 represents a plan view of the cover and of the accumulator of figure 1;
- figure 3 represents a side view of a partial section along the plane A-A of the cover and of the accumulator of figure 2;
- figure 4 represents a side view of a partial section along the plane B-B of the cover and of the accumulator of figure 2;
- figure 5 represents an axonometric view of a variant embodiment of the cover and of the relative accumulator of figure 1;
- figure 6 represents a side view of a partial section of the cover and of the accumulator of figure 5 along a plane A-A analogous to that of figure 2;
- figure 7 represents another side view of a partial section of a variant embodiment of the cover and of the accumulator of figure 5;
- figure 8 represents another side view of a partial section of another variant embodiment of the cover and of the relative accumulator of figure 5;
- figure 9 represents an axonometric view of a variant embodiment of the cover and of the accumulator of figure 5;

AUXILIARY REQUEST (I)

- 1) Cover (2, 200, 201, 203, 204) for an electric accumulator (1, 100, 101, 102, 103, 104) of the type with free electrolyte adapted to be integral with the container (3) of said accumulator (1, 100, 101, 102, 103, 104) said cover comprising at least one valve device (9) having an inlet (10) communicating with one or more cells (5) of said accumulator and an outlet communicating (11) with the external environment (A), said valve device being adapted to prevent the leaking of electrolyte (E) present in said one or more cells (5) and to allow the disposal to the outside of the gases that develop inside said accumulator (1, 100, 101, 102, 103, 104) when the pressure in said one or more cells (5) exceeds a predetermined value;

said valve device (9) communicates with said one or more cells (5) through at least one discharge channel (12) having at least one inlet mouth (13) communicating with said one or more cells (5) and at least one outlet mouth (14) communicating with said inlet (10);

characterised in that

said at least one inlet mouth (13) communicates with said one or more cells (5) through at least one accumulation chamber (18) each communicating with one of said one or more cells (5) through at least one vent channel (19).

- 2) Cover (203) according to claim 1)

characterised in that

the lower surface of said accumulation chamber (18) has one or more tilted planes (20) converging towards said at least one vent channel (19) to ease the re-entry of the electrolyte (E) into the corresponding cell (5).

- 3) Cover (203) according to claim 1) or 2)

characterised in that

the upper surface of said accumulation chamber (18) has one or more upper tilted planes (21) that define second tanks (22) adapted to further hold said electrolyte (E).

- 4) Cover (201, 202, 203) according to one of claims 1) to 3)

characterised in that

the lower surface of said at least one discharge channel (12) has one or more tilted planes (15) converging towards said at least one inlet mouth (13) to ease the re-entry of the electrolyte (E) into said one or more cells (5) and to equally distribute the electrolyte (E) present in said at least one discharge channel (12) between said one or more cells (5).

- 5) Cover (202, 203) according to any one of the previous claims

characterised in that

the upper surface of said discharge channel (12) has one or more tilted planes (16) that define first tanks (17) communicating with each other.

- 6) Cover (204) according to claim 1)

characterised in that

each of said one or more cells (5) is provided with at least one valve device (9).

- 7) Cover (2, 200, 201, 202, 203, 204) according to any one of the previous claims

characterised in that

said at least one valve device (9) is an over-pressure valve.

- 8) Cover (2, 200, 201, 203, 204) according to any one of the previous claims

characterised in that

said predetermined over-pressure value is not less than the pressure exerted by the head of said electrolyte (E) on

said inlet (10) when said accumulator (1, 100, 101, 102, 103, 104) is arranged upside down.

- 9) Electric accumulator (1, 100, 101, 102, 103, 104) of the type with free electrolyte comprising:

a container (3) provided on the inside with at least one cell (5) adapted to house the plate groups (8) of said accumulator (1, 100, 101, 102, 103, 104) and to contain the electrolyte (E);

at least one cover (2, 200, 201, 203, 204) adapted to dose said container (3);

characterised in that

said at least one cover (2, 200, 201, 203, 204) is realised according to any one of claims 1) to 8).